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EXAMINER	
KAU, STEVEN Y	

ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/635,381	MALTZ ET AL.	
	Examiner	Art Unit	
	STEVEN KAU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 April 2010*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-8 and 10-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-8 and 10-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *05 August 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. This is in response to Applicant(s) arguments filed on 04/20/2010.

- The following is the current status of claims:

  Claim 9 has been canceled, and claims 1-8, and 10-23 remain pending for examination, with claims 1, 10 and 23 being independent. Claim 10, has been amended.

- Response to Remarks/Arguments:

  (1) Applicant's arguments filed 9/8/2009 and 10/29/2009, with respect to the rejection of claims 1, 7, 8, 11 and 22-24 under 35 U.S.C. 103(a) have been fully considered but they are not persuasive for the following reasons, see sections I (response to Remarks/Arguments) and II (repeated rejections).

In response to applicant's arguments, "The Applicant also respectfully notes that the claims contain many more limitations than the "automatic input", use of a "color sensor", "iterative controller". The Applicant respectfully requests the Examiner review the Applicant's remarks with respect to each of the claims and the associated arguments as the Applicant respectfully believes a large number of the claims contain limitations not taught or suggested by the references.", page 8, Remarks, 4/20/2010 (note: the paragraphs cited in this Action is from Remarks, 4/20/2010), the examiner has given a detailed discussion in the rejection section of how each of claim elements is taught and

suggested by the prior art of references in the previous Actions in the record. However, in view of applicant's remarks and argument, applicant argued that examiner has not established the prima facie finding the Actions. Therefore, the examiner will go over applicant's argument one more time to address how the claim elements are taught by the prior arts in record.

With respect to section "Claim Rejection – 35 U.S.C. § 103", applicant cites MPEP §2143, and is recited in the following:

Requirements for Prima Facie Obviousness

The obligation of the examiner to go forward and produce reasoning and evidence in support of obviousness is clearly defined at M.P.E.P. §2142:

> The examiner bears the initial burden of factually supporting any *prima facie* conclusion of obviousness. If the examiner does not produce a *prima facie* case, the applicant is under no obligation to submit evidence of nonobviousness.

M.P.E.P. §2143 sets out the three basic criteria that a patent examiner must satisfy to establish a *prima facie* case of obviousness:

1. some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings;

2. a reasonable expectation of success; and

3. the teaching or suggestion of all the claim limitations by the prior art reference (or references when combined).

It follows that in the absence of such a *prima facie* showing of obviousness by the Examiner (assuming there are no objections or other grounds for rejection), an applicant is entitled to grant of a patent. *In re Oetiker,* 977 F.2d 1443, 1445, 24 USPQ2d 1443 (Fed. Cir. 1992). Thus, in order to support an obviousness rejection, the Examiner is obliged to produce evidence compelling a conclusion that each of the three aforementioned basic criteria has been met.

Applicant further notes that the U.S. Supreme Court ruling of April 30, 2007 *(KSR Int'l v. 7-eleflex Inc.)* states:

> "The TSM test captures a helpful insight: A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art. Although common sense directs caution as to a patent application claiming as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that

> would have prompted a person of ordinary skill in the art to combine the elements as the new invention does."

"To facilitate review, this analysis should be made explicit."

The U.S. Supreme Court ruling states that it is important to identify a *reason* that would have prompted a person to combine the elements and to make that analysis *explicit*."

The examiner also notices that

> "If a prima facie case of obviousness is established, the burden shifts to the applicant to come forward with arguments and/or evidence to rebut the prima facie case. See, e.g., In re Dillon, 919 F.2d 688, 692, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990). Rebuttal evidence and arguments can be presented in the specification, In re Soni, 54 F.3d 746, 750, 34 USPQ2d 1684, 1687 (Fed. Cir. 1995), by counsel, In re Chu, 66 F.3d 292, 299, 36 USPQ2d 1089, 1094-95 (Fed. Cir. 1995), or by way of an affidavit or declaration under 37 CFR 1.132, e.g., Soni, 54 F.3d at 750, 34 USPQ2d at 1687; In re Piasecki, 745 F.2d 1468, 1474, 223 USPQ 785, 789-90 (Fed. Cir. 1984)." (MPEP 2145 [R-6]).

In this regard, the examiner assumes that applicant agrees with the examiner that this is one of the common grounds for patent application prosecution process. However, the applicant has ignored the fact that the prior arts in the record provide "1. some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings; 2. a reasonable expectation of success; and 3. the teaching or suggestion of all the claim limitations by the prior art reference (or references when combined)." And therefore, the applicant has not rebutted the prima facie case provided in the Action in the record. Rather, denying all prima facie evidences and asserts that the prior arts in record failed to provide some teaching, or some suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to

combine reference teachings. Thus, applicant's arguments in this regard are unpersuasive.

With regarding the subsection "Shimizu in view of Mahy and Mestha", applicant cites the 103 rejection of claims 10 and 11, which discussed how claims 10 and 11 are taught by prior art Shimizu in view of Mahy and Mestha from the Office Action, and then argued:

"The Applicant would like to once again reiterate, the present invention never teaches discusses, considers, describes, or even contemplates a color conversion table in any capacity, The color conversion table does not read on the present invention." Page 12, Remarks.

In re, the examiner has iterated that the prior art Shimizu (US 7,167,277) discloses color data conversion method (Figures 5, 6, 8, 10 and 15), and color data conversion apparatus (Figure 17) for controlling color points outside of a color gamut. For instance, "When an L*a*b* value of a certain color is outside a target color gamut to be converted, it is judged whether the L*a*b* value is located within the range of the color gamut set under a predetermined condition. This set range is a range in which the accuracy is degraded if colors are converted using only a first method, for example, a range in the neighborhood of the color gamut. If a color to be converted is located within the range, colors are converted using a second method. If the L*a*b* value of the color to be converted is outside of the set range, it is converted using the first method until the conversion result is contained within the range Then, the occurrence of both a problem

which the first conversion method has for colors in the neighborhood of the color gamut when colors are converted and a problem which the second method has in the conversion of a color far from the color gamut can be suppressed." (Abstract, Shimizu' 277). And "The color conversion method of the present invention converts color data to color data inside a target color gamut, and comprises the steps of (a) judging whether color data to be converted are contained in an area predetermined for the target color gamut, and (b) converting the color data using one of at least two color gamut conversion methods or combining two or more color gamut conversion methods according to the judgment result in step (a) and outputting the result of the conversion. The color conversion apparatus of the present invention converts color data to color data inside a target color gamut, and comprises a judging unit for judging whether color data to be converted are contained in an area predetermined for the target color gamut and a conversion unit for converting the color data using one of at least two color gamut conversion methods or combining two or more color gamut conversion methods according to the judgment by the judging unit and outputting the result of the conversion."

"The color conversion table of the present invention converts colors displayed on a first device to colors which can be displayed on a second device, and both color data values generated by a color conversion method comprising the steps of (a) judging whether color data to be converted are contained in an area predetermined for the target color gamut and converting the color data using one of at least two color gamut conversion methods or combining two or more color gamut conversion methods according to the

judgment result in step (a) and outputting the result of the conversion, and the color data values of the second device corresponding to them are registered therein. ” (see col 7, lines 23-52, Shimizu’ 277). Therefore, regardless what applicant stated in the Remarks, i.e. “The Applicant would like to once again reiterate, the present invention never teaches discusses, considers, describes, or even contemplates a color conversion table in any capacity, The color conversion table does not read on the present invention.”, it is a prima facie evidence that, prior art Shimizu teaches “When an L*a*b* value of a certain color is outside a target color gamut to be converted, it is judged whether the L*a*b* value is located within the range of the color gamut set under a predetermined condition. This set range is a range in which the accuracy is degraded if colors are converted using only a first method, for example, a range in the neighborhood of the color gamut. If a color to be converted is located within the range, colors are converted using a second method. If the L*a*b* value of the color to be converted is outside of the set range, it is converted using the first method until the conversion result is contained within the range Then, the occurrence of both a problem which the first conversion method has for colors in the neighborhood of the color gamut when colors are converted and a problem which the second method has in the conversion of a color far from the color gamut can be suppressed.”, which provide some teaching, some suggestion and motivation in the claim subject matter as discussed in the previous Action in record.

Applicant argues in the section:

“The Applicant further asserts the color sensor cited in Shimizu is not used to determine which color has attained a gamut limit as claimed in the present invention. The

Examiner has cited material in Shimizu that the Examiner argued discloses an algorithm that has steps to determine a shortest distance from a boundary which is dynamically performed. The Applicant respectfully asserts that even if the reference does teach these limitations there is still no teaching or suggestion that a color sensor is used to perform the actions." Pages 12-13, Remarks.

"The fact that Shimizu (and the majority of the Examiner's citations to Shimizu) is fundamentally related to the use of color conversion tables highlights the fact that the features of the present invention are not taught or suggested by the reference because they operate in a fundamentally different way."

Finally, the Applicant respectfully asserts the Examiner has verified this analysis in the Examiner's citations to Shimizu. The Examiner first cited material as teaching a color sensor. Then later in the office action the Examiner cited different material as teaching the color sensor being used to determine which color has attained a gamut limit. It is worth noting that none of the material cited with regard to the color sensor speaks to the limitation regarding the function of the color sensor as determining which color has attained a gamut limit. Likewise, the material cited as teaching determining which color has reached a gamut limit actually teaches away from using a color sensor. All in all, it is clear that the color sensor cited in", page 13, Remarks.

"Shimizu fails to teach or suggest that the color sensor itself is used to determine which color has attained a gamut limit. Thus, the Examiner's own citations speak to the patentability of the present invention."

"The Applicant respectfully disagrees that the Shimizu reference teaches an iterative controller. The Applicant respectfully requests the Examiner review the amendment to claim 10. Claim 10 now more clearly illustrates the function of the iterative controller claimed and distinguishes that iterative controller from the "controller of a printer process" cited."

"Specifically, the cited material describes the way that color data, for example CMY values, is used to instruct a printer how to print a color. Claim 10, as amended, is now fully unrelated to the printer controller being described in the reference. The referenced "controller" simply "instructs the printing head as to the amount of cyan, magenta and yellow ink that should be painted for each pixel." The presently claimed iterative controller is not used to instruct a printer on how much of each color to paint on a piece of paper. It is used to control the iterative process described in the present claims and disclosure, to reduce the particular dimensional order based on a determination of which color value among said plurality of color values has attained a gamut limit. In view of this amendment, the Applicant respectfully asserts claim 10 is now in condition for allowance."

“In sum, the Applicant has presented a multitude of features, both structural and functional, not taught or suggested by the Shimizu reference. In addition, claim 10 has been amended to include the specific function of the iterative controller. This amendment clearly distinguishes the present invention from the cited material because Shimizu fails to teach or suggest an iterative process comparable to that in claim 10. The Examiner has repeatedly admitted Mahy simply constitutes a statement of the fact that a mathematical space of n dimension's can be defined by its boundaries and that said boundaries have a dimension n-1. This surely does not teach, as the Examiner suggests, using a transformation module to determine colors at or beyond a gamut limit. The language cited by the Examiner is, in essence, a scholarly lecture on the meaning of "color"”, page 14, Remarks.

“gamut" and the geometric properties of mathematical spaces followed by a conclusion that this language teaches or suggests use of a transformation module to determine colors that have reached a gamut limit. The fact that the word "transformation" appears in the reference is not sufficient to teach a transformation module as taught by Applicant's invention. A transformation and a transformation module are not the same. In the Mahy disclosure, the word "transformation" is only being used as part of the definition of a color gamut. The Applicant has claimed a transformation module. Such a module indicates an ability to implement a transformation through software. In other words, the Applicant's claims describe the ability to perform a transformation whereas Mahy simply gives a definition. Thus, Mahy fails to teach a module.
The Applicant respectfully notes the Examiner has still failed to offer any explanation of why this argument was not persuasive. The Mahy abstract provides further evidence of the scope of the Mahy reference. The abstract states Mahy is "[a] method and an apparatus disclosed to obtain a color gamut description of a multidimensional color reproduction device." This clearly indicates, as the Applicant has repeatedly asserted, that Mahy is simply a method for describing a gamut, not a module for transforming a gamut.”

“The Applicant also respectfully asserts the Examiner has not adequately taken into account the relationship between the iterative controller and transformation module. As the Examiner will note, the iterative controller controls the transformation module which is provided within the iterative controller thereby operating iteratively to reduce said particular dimensional order based on a determination of which color value among said plurality of color values has attained a gamut limit. The Examiner argued that the iterative controller is taught by Shimizu, but the transformation module (which, as presently claimed, is being operated iteratively by the iterative controller), is taught by Mahy. However, there is nothing in either Shimizu or Mahy suggesting the limitation as claimed that the transformation module is within the iterative controller (and thereby being iteratively controlled). This represents yet another structural limitation of the present invention not taught or suggested by the references.”, page 15, Remarks.

"the Examiner's assertion that "combining Mahy's teaching with Shimizu et al's reference, dimensional order of 3-ink can be reduced to a two-ink process, which can improve the out of gamut color control process" is a conclusory statement that lacks any articulated reasoning or underpinning as required in the MPEP. Specifically, the Applicant has repeatedly pointed out that the Examiner admitted Shimizu lacks a transformation module, thus it is incumbent on the Examiner to explain why including the alleged transformation module from Mahy in Shimizu would be obvious.
Further, the Examiner's statement that the combination of the references "can improve the out of gamut color control process" is exactly the type of "mere conclusory statement" which is invalid to establish obviousness as described in the MPEP. As such, the Applicant respectfully asserts the Examiner has failed to establish prima facie obviousness", page 16, Remarks.

"This is particularly applicable to the present application. The Examiner has repeatedly admitted that Mahy teaches a mathematical fact and is a self- described "method and an apparatus disclosed to obtain a color gamut description of a multidimensional color reproduction device". Thus, the Mahy reference simply teaches a mathematical truth, in order to establish prima facie obviousness according to MPEP § 2143.01 VI, the Examiner has the burden of describing how a reference to a mathematical explanation of how to describe a color gamut could be used to modify Shimizu without changing the principal of operation. There is absolutely nothing in either the Shimizu or Mahy references which would motivate one or ordinary skill in the art to combine that the gamut description method described in Mahy with the Shimizu invention.
Further, the Examiner claims the combination could yield predictable results without citing anything explaining how or what that predictable result would be. Simply restating words literally derived from the Applicant's own claims, that the result would be improved gamut control, is not enough to establish prima facie obviousness. The Examiner must offer some explicit explanation of how that result would be achieved and what it would be without the benefit of hindsight (which includes the Applicant's specification)."

"Likewise, the Applicant respectfully asserts both the Shimizu and Mahy inventions function without need for an adder module. Thus, the Examiner must offer some explanation of how including an adder module in Shimizu would improve the Shimizu invention without changing the mode of operation of the reference. The Applicant respectfully asserts the Examiner's conclusory statement that the combination would "provide improved control for colors that are located external to said gamut" is insufficient to establish prima facie obviousness in accord with the MPEP citations provided above."

"Based on the arguments presented above the Applicant respectfully requests the rejection of claims 10 and 11, based on 35 USC 103, be withdrawn.", pages 16-17, Remarks.

MPEP 2111: During patent examination, the pending claims must be "given the broadest reasonable interpretation consistent with the specification". Applicant always has the opportunity to amend the claims during prosecution and broad interpretation by the examiner reduces the possibility that the claim, once issued, will be interpreted more broadly than is justified. In re Prater, 162 USPQ 541,550-51 (CCPA 1969). The court found that applicant was advocating ... the impermissible importation of subject matter from the specification into the claim. See also In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023, 1027-28 (Fed. Cir. 1997) (The court held that the PTO is not required, in the course of prosecution, to interpret claims in applications in the same manner as a court would interpret claims in an infringement suit. Rather, the "PTO applies to verbiage of the proposed claims the broadest reasonable meaning of the words in their ordinary usage as they would be understood by one of ordinary skill in the art, taking into account whatever enlightenment by way of definition or otherwise that may be afforded by the written description contained in application's specification.").

The broadest reasonable interpretation of the claims must also be consistent with the interpretation that those skilled in the art would reach. In re Cortright, 165 F.3d 1353, 1359, 49 USPQ2d 1464, 1468 (Fed. Cir. 1999).

MPEP 2141.02: In determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Stratoflex, Inc. v. Aeroquip Corp., 713 F.2d 1530, 218 USPQ 871 (Fed. Cir. 1983);

Schenck v. Nortron Corp., 713 F.2d 782, 218 USPQ 698 (Fed. Cir. 1983) (Claims were directed to a vibratory testing machine (a hard-bearing wheel balancer) comprising a holding structure, a base structure, and a supporting means which form “a single integral and gaplessly continuous piece.” Nortron argued the invention is just making integral what had been made in four bolted pieces, improperly limiting the focus to a structural difference from the prior art and failing to consider the invention as a whole. The prior art perceived a need for mechanisms to dampen resonance, whereas the inventor eliminated the need for dampening via the one-piece gapless support structure. “Because that insight was contrary to the understandings and expectations of the art, the structure effectuating it would not have been obvious to those skilled in the art.” 713 F.2d at 785, 218 USPQ at 700 (citations omitted).). See also In re Hirao, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) (Claims were directed to a three step process for preparing sweetened foods and drinks. The first two steps were directed to a process of producing high purity maltose (the sweetener), and the third was directed to adding the maltose to foods and drinks. The parties agreed that the first two steps were unobvious but formed a known product and the third step was obvious. The Solicitor argued the preamble was directed to a process for preparing foods and drinks sweetened mildly and thus the specific method of making the high purity maltose (the first two steps in the claimed process) should not be given weight, analogizing with product-by-process claims. The court held “due to the admitted unobviousness of the first two steps of the claimed combination of steps, the subject matter as a whole would not have been obvious to one of ordinary skill in the art at the time the invention was made.” 535 F.2d at 69, 190

USPQ at 17 (emphasis in original). The preamble only recited the purpose of the process and did not limit the body of the claim. Therefore, the claimed process was a three step process, not the product formed by two steps of the process or the third step of using that product.).

MPEP 2114: APPARATUS CLAIMS MUST BE STRUCTUR-ALLY DISTINGUISHABLE FROM THE PRIOR ART

>While features of an apparatus may be recited either structurally or functionally, claims< directed to >an< apparatus must be distinguished from the prior art in terms of structure rather than function. >In re Schreiber, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997) (The absence of a disclosure in a prior art reference relating to function did not defeat the Board’s finding of anticipation of claimed apparatus because the limitations at issue were found to be inherent in the prior art reference); see also In re Swinehart, 439 F.2d 210, 212-13, 169 USPQ 226, 228-29 (CCPA 1971);< In re Danly, 263 F.2d 844, 847, 120 USPQ 528, 531 (CCPA 1959). “[A]pparatus claims cover what a device is, not what a device does.” Hewlett-Packard Co. v. Bausch & Lomb Inc., 909 F.2d 1464, 1469, 15 USPQ2d 1525, 1528 (Fed. Cir. 1990) (emphasis in original).

MPEP 2106: Limitations appearing in the specification but not recited in the claim should not be read into the claim. E-Pass Techs., Inc. v. 3Com Corp., 343 F.3d 1364, 1369, 67 USPQ2d 1947, 1950 (Fed. Cir. 2003) (claims must be interpreted “in view of

the specification" without importing limitations from the specification into the claims unnecessarily). In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-551 (CCPA 1969). See also In re Zletz, 893 F.2d 319, 321-22, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989) ("During patent examination the pending claims must be interpreted as broadly as their terms reasonably allow.... The reason is simply that during patent prosecution when claims can be amended, ambiguities should be recognized, scope and breadth of language explored, and clarification imposed.... An essential purpose of patent examination is to fashion claims that are precise, clear, correct, and unambiguous. Only in this way can uncertainties of claim scope be removed, as much as possible, during the administrative process.").

In re, with respect to claim 10 submitted on 10/29/2009 for examination, recites:

"A system, comprising:

a plurality of color values automatically provided as input to an image processing device, wherein said image processing device is under a control of a particular dimensional order;

a color sensor for dynamically determining which color value among said plurality of color values has attained a gamut limit; an iterative controller; a transformation module provided within said iterative controller for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit; and

<u>an adder module for adding feedback obtained through said transformation module,</u>

thereby providing improved control for colors that are located external to said gamut." (Emphasis added by the applicant).

The structure of claim 10 comprises: (1). an input to an image processing device; (2). a color sensor; (3). an iterative controller; (4), a transformation module; and (5) an adder. Claim10 does not cite “iterative process” in the claim language.

Claim interpretation in the application prosecution:

An iterative controller – a controller, or a CPU processor, has an inherent property to perform functions iteratively. For instance, image data is repeatedly processed, i.e. determining whether or not a pixel(s) is outside a color gamut, and pixel values reading/writing into registers, memories are repeatedly updated when color sensor dynamically determines which color value among said plurality of color values has attained a gamut limit, etc. A controller controls many functions and processes, i.e. inputs, outputs, color sensor, transformation module, and an adder, etc. However, functions or devices controlled by the controller or within the “iterative controller” are not necessary performing function iteratively. For instance, for a particular print job, scanner reads in image data to an image processing device, and an output through a printer engine, do not function iteratively for that print job. In the claim, it is broadly to claim “a transformation module provided within said iterative controller for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit”, and “an adder module for adding feedback obtained through said transformation module, thereby providing improved control for colors that are located external to said gamut.” The claim neither specifies

that the transformation module performs **an iterative process** for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit, nor particularly point out where the feedback is added to. Since the input, color sensor, transformation module and the adder are within the “iterative controller”, and the claim language does not specifying the input, the color sensor, transformation module and the adder function iteratively, the examiner does not consider the transformation module performs the automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit **iteratively**, because examiner must not read the limitations from the specification into the claim.

In the claim limitation rejection of “iterative controller”, the examiner does not only relies on Shimizu’ 277, columns 11-12, but also relies on Figures 7, 12, and 13. In the Action, the examiner stated, “an iterative controller (e.g. "iterative controller", a controller processes an iteration loop(s); Shimizu discloses an example of the controller of a printer processes color value for each pixel, col 1, lines 24-35, and the processes of Figs. 7, 12 and 13 for generating a color conversion table for printers for converting L*a*b* values to CMY values indicate multiple iteration processes, col 11, line 60 to col 12, line 42, and so on; thus, the controller of a printer must perform iterative loops in the processes of Figs. 7, 12 and 13); and within said iterative controller (e.g. a conversion table for printer/controller to convert L*a*b* values to CMY values and thus the conversion table is indeed within the controller, col 11, line 60 to col 12, line 42; and in

addition, conversion unit or module converts color data to color data inside a target color gamut and is within the color conversion apparatus 10 and is controlled by printer controller, Fig. 17, col 27, lines 37-58).” Page 10, Action, 01/16/2010. Referring to Figures 7, 12, and 13, these figures teach repeated calculations for pixels outside the color gamut and convert the out of gamut pixels one pixel a time until there is no more out of gamut pixels. For instance, Figure 7, the initial L*a*b* values are set to 0 in Step 10. Step 12, determining whether the pixel is out of color gamut or not, if the result is positive, then conversion is taken place, i.e. Steps 20 and 21, converting L*a*b* pixel values to CMY values; then in Step 22, b* value is updated based on the previous value, i.e. b=b+1, (b was 0 in the beginning). Step 23, if b* is not equal to 17, the process is repeated. Therefore, this loop repeats at least 10 or more times for determine whether a pixel is inside or outside the color gamut, if it is located outside of the color gamut, then converts the L*a*b* values to CMY values. The calculation of repeat process is also applied to a* value and L* value.

In addition, the word “iteration”, according tohttp://en.wikipedia.org, “**Iteration** means the act of repeating a process usually with the aim of approaching a desired goal or target or result. Each repetition of the process is also called an “iteration” and the results of one iteration are used as the starting point for the next iteration.”

Figure 7 of prior art Shimizu’ 277 teaches the subject matter as set forth above. Thus, prior art Shimizu’ 277 does teach “iterative controller” as well as iterative processes.

Shimizu provides some teaching and suggestion of using the color sensor to determine which color has attained a gamut limit as claimed in the present invention. For instance, “a distance (amount of conversion) between the point to be converted and the boundary of the color gamut D3 is measured along the straight line”, (col 10, line 62 to col 11, line 8, and Fig. 6), “For a process used to obtain CMY value corresponding to an L*a*b* value distributed in a grid shape based on the measurement value of a patch outputted from the printer in this second preferred embodiment”,(col 11, line37 to col 12, line 19, and Fig. 6, Shimizu’ 277), “Therefore, a point (Ld0, ad0, bd0) located at the distance of the predetermined value (10 here) which is measured along the chord clipping conversion straight line from the color gamut boundary toward the point to be converted, is calculated as follows using both the coordinate value and the coordinated value (L0, a0, b0; L*a*b* value) of the point to be converted (step S18).”, (col 13, lines 5-43, and Fig. 7, Shimizu’ 277), and it is a well known in the art that color value measurement must be performed wit a color sensor, i.e. “An I/O interface 40 is connected to the CPU 20 through a bus 30, and controls, for example, a printer (not shown in figure) or a calorimeter (not shown in figure), causes a printer to print a color slip (patch printing), causes the calorimeter to measure the color of the printed color slip, and transmits the measurement result to the CPU 20”, (col 28, lines 41-47, Shimizu’ 277). Thus, applicant’s arguments, i.e. “The Applicant further asserts the color sensor cited in Shimizu is not used to determine which color has attained a gamut limit as claimed in the present invention. The Examiner has cited material in Shimizu that the Examiner argued discloses an algorithm that has steps to determine a shortest distance from a

boundary which is dynamically performed. The Applicant respectfully asserts that even if the reference does teach these limitations there is still no teaching or suggestion that a color sensor is used to perform the actions.", are unpersuasive.

Applicant presented similar arguments for the remaining claims. The above reply is also applied to the arguments for the remaining claims. Claim language defines the metes and bonds of intellectual property, and applicant has opportunities to amend the claims to avoid any interference with others, and/or to overcome the obviousness rejection. Based on the above discussion and rational, the examiner believes the rejection in the previous Action is proper and still stands.

The examiner would like to reference the applicant to the rejection section to see how the prior arts provide some teaching, or some suggestion, or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

3. Claims 10-12, 15-16 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (US 7,167,277) in view of Mahy (US 5,832,109) and Mestha et al (US 6,236,474).

Regarding **claim 10**.

Shimizu discloses system (**e.g. the system of Fig 18, col 28, lines 5-47**), comprising:

a plurality of color values (**such as L255*, a255* & b255* value, corresponding to CMY color data value, col 2, lines 28-59, and as shown in Fig. 5, L*a*b* value is input to the system for process, col 10, lines 10-35**) automatically provided as input to an image processing device (**e.g. L*a*b* values based on the measurement of a patch outputted from the printer corresponding to CYM values are as input initial value; since the L*a*b* values obtained and inputted in the process are not manually performed, rather, the programmed process is executed and performed**

by a computer of Figs. 18 and 19, thus, data is automatically provided as input to the image processing device shown in Figs. 18 & 19; see Fig. 5, col 10, lines 12-16), wherein said image processing device is under a control of a particular dimensional order (**e.g. processing in three three-dimensional arrays, col 13, lines 51-65**); a color sensor (**e.g. measurement of L*a*b* values indicates that a color sensor must be used for color measuring, col 11, lines 65-67 & col 12, lines 1-19**) for dynamically determining which color value among said plurality of color values has attained a gamut limit (**e.g. Shimizu discloses a flowchart or algorithm which has a steps to determine shortest distance from boundary of color gamut in Figs. 7 & 9, judging whether color value is near the color gamut boundary which is actively or dynamically performed, col 13, lines 5-37 & col 15, lines 41-66**); an iterative controller (**e.g. "iterative controller", a controller processes an iteration loop(s); Shimizu discloses an example of the controller of a printer processes color value for each pixel, col 1, lines 24-35, and the processes of Figs. 7, 12, 13 and 16 for generating a color conversion table for printers for converting L*a*b* values to CMY values indicate multiple iteration processes, col 11, line 60 to col 12, line 42, and so on; thus, the controller of a printer must perform iterative loops in the processes of Figs. 7, 12 and 13**) <u>for reducing error associated with said plurality of color values</u> (**referring to Fig. 5, Step S6, second color gamut conversion method is used to convert color value L*a*b* to suppress problem 1, and problem 1 includes the error of CMY color value corresponding to an L*a*b* value degraded during the conversion process, and color value inside the color gamut is also**

affected and degraded, col 10, lines 30-35; and referring to Fig. 7, Step S19, i.e. " If the amount of conversion C is 10 or less, it is judged that the point is near to a color gamut boundary, and a point (Ld0, ad0, bd0) in an L*a*b* space is converted to the nearest point on the color gamut boundary on the condition that Ld0=L0, ad0=a0 and bd0=b0 using the closest neighborhood method described earlier in which problem 1 is likely to occur (step S19)", col 13, lines 10-16; that is, the process in Fig. 7 is performed iteratively to suppress problem 1, or to reduce the error iteratively); and within said iterative controller (**e.g. a conversion table for printer/controller to convert L*a*b* values to CMY values and thus the conversion table is indeed within the controller, col 11, line 60 to col 12, line 42; and in addition, conversion unit or module converts color data to color data inside a target color gamut and is within the color conversion apparatus 10 and is controlled by printer controller, Fig. 17, col 27, lines 37-58**).

Shimizu does not explicitly disclose that a transformation module for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit; an adder module for adding feedback obtained through said transformation module, thereby providing improved control for colors that are located external to said gamut.

In the same field of endeavor, Mahy teaches that a transformation module for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit (**e.g. Mahy discloses an example mathematical model of 3-ink process with one color value**

c_1 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58);

In the same field of endeavor, Mahy's teaching is combinable to modify Shimizu et al reference for reducing dimensions. For example, **"If the amount of conversion C is 10 or less, it is judged that the point is near to a color gamut boundary, and a point (Ld0, ad0, bd0) in an L*a*b* space is converted to the nearest point on the color gamut boundary on the condition that Ld0=L0, ad0=a0 and bd0=b0 using the closest neighborhood method described earlier in which problem 1 is likely to occur (step S19)"** (col 13, lines 5-15), and by combining Mahy's teaching with Shimizu et al's reference, dimensional order of 3-ink can be reduced to a two-ink process, which, can improve the out of gamut color control process; and

In the same filed of endeavor, Mestha teaches an adder module (**i.e. a summing node**) for adding feedback obtained through said transformation module (**i.e. referring to Fig. 2, Controller 114 includes an adder for adding feedback obtained through the transformation block, or module, col 4, lines 3-50**), thereby providing improved control for colors that are located external to said gamut (**i.e. gamut color error is corrected and thereby to improve image reproduction quality, Figs. 2 and 3, col 4, line 3 to col 5, line 29**).

The structure of claim 10 comprises: (1). an input to an image processing device; (2). a color sensor; (3). an iterative controller; (4), a transformation module; and (5) an adder. Claim10 does not cite "iterative process" in the claim language.

Claim interpretation in the application prosecution:

An iterative controller – a controller, or a CPU processor, has an inherent property to perform functions iteratively. For instance, image data is repeatedly processed, i.e. determining whether or not a pixel(s) is outside a color gamut, and pixel values reading/writing into registers, memories are repeatedly updated when color sensor dynamically determines which color value among said plurality of color values has attained a gamut limit, etc. A controller controls many functions and processes, i.e. inputs, outputs, color sensor, transformation module, and an adder, etc. However, functions or devices controlled by the controller or within the "iterative controller" are not necessary performing function iteratively. For instance, for a particular print job, scanner reads in image data to an image processing device, and an output through a printer engine, do not function iteratively for that print job. In the claim, it is broadly to claim "a transformation module provided within said iterative controller for automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit", and "<u>an adder module for adding feedback obtained through said transformation module,</u> thereby providing improved control for colors that are located external to said gamut." The claim neither specifies that the transformation module performs **<u>an iterative process</u>** for automatically reducing said particular dimensional order based on determining which color value

among said plurality of color values has attained said gamut limit, nor particularly point out where the feedback is added to. Since the input, color sensor, transformation module and the adder are within the “iterative controller”, and the claim language does not specifying the input, the color sensor, transformation module and the adder function iteratively, the examiner does not consider the transformation module performs the automatically reducing said particular dimensional order based on determining which color value among said plurality of color values has attained said gamut limit **iteratively**, because examiner must not read the limitations from the specification into the claim.

In the claim limitation rejection of “iterative controller”, the examiner does not only relies on Shimizu’ 277, columns 11-12, but also relies on Figures 7, 12, and 13. In the Action, the examiner stated, “an iterative controller (e.g. "iterative controller", a controller processes an iteration loop(s); Shimizu discloses an example of the controller of a printer processes color value for each pixel, col 1, lines 24-35, and the processes of Figs. 7, 12 and 13 for generating a color conversion table for printers for converting L*a*b* values to CMY values indicate multiple iteration processes, col 11, line 60 to col 12, line 42, and so on; thus, the controller of a printer must perform iterative loops in the processes of Figs. 7, 12 and 13); and within said iterative controller (e.g. a conversion table for printer/controller to convert L*a*b* values to CMY values and thus the conversion table is indeed within the controller, col 11, line 60 to col 12, line 42; and in addition, conversion unit or module converts color data to color data inside a target color gamut and is within the color conversion apparatus 10 and is controlled by printer

controller, Fig. 17, col 27, lines 37-58).” Page 10, Action, 01/16/2010. Referring to Figures 7, 12, and 13, these figures teach repeated calculations for pixels outside the color gamut and convert the out of gamut pixels one pixel a time until there is no more out of gamut pixels. For instance, Figure 7, the initial L*a*b* values are set to 0 in Step 10. Step 12, determining whether the pixel is out of color gamut or not, if the result is positive, then conversion is taken place, i.e. Steps 20 and 21, converting L*a*b* pixel values to CMY values; then in Step 22, b* value is updated based on the previous value, i.e. b=b+1, (b was 0 in the beginning). Step 23, if b* is not equal to 17, the process is repeated. Therefore, this loop repeats at least 10 or more times for determine whether a pixel is inside or outside the color gamut, if it is located outside of the color gamut, then converts the L*a*b* values to CMY values. The calculation of repeat process is also applied to a* value and L* value.

In addition, the word “iteration”, according tohttp://en.wikipedia.org, “**Iteration** means the act of repeating a process usually with the aim of approaching a desired goal or target or result. Each repetition of the process is also called an “iteration” and the results of one iteration are used as the starting point for the next iteration.”

Figure 7 of prior art Shimizu’ 277 teaches the subject matter as set forth above. Thus, prior art Shimizu’ 277 does teach “iterative controller” as well as iterative processes.

Shimizu provides some teaching and suggestion of using the color sensor to determine which color has attained a gamut limit as claimed in the present invention.

For instance, “a distance (amount of conversion) between the point to be converted and the boundary of the color gamut D3 is measured along the straight line”, (col 10, line 62 to col 11, line 8, and Fig. 6), “For a process used to obtain CMY value corresponding to an L*a*b* value distributed in a grid shape based on the measurement value of a patch outputted from the printer in this second preferred embodiment”,(col 11, line37 to col 12, line 19, and Fig. 6, Shimizu’ 277), “Therefore, a point (Ld0, ad0, bd0) located at the distance of the predetermined value (10 here) which is measured along the chord clipping conversion straight line from the color gamut boundary toward the point to be converted, is calculated as follows using both the coordinate value and the coordinated value (L0, a0, b0; L*a*b* value) of the point to be converted (step S18).”, (col 13, lines 5-43, and Fig. 7, Shimizu’ 277), and it is a well known in the art that color value measurement must be performed wit a color sensor, i.e. “An I/O interface 40 is connected to the CPU 20 through a bus 30, and controls, for example, a printer (not shown in figure) or a calorimeter (not shown in figure), causes a printer to print a color slip (patch printing), causes the calorimeter to measure the color of the printed color slip, and transmits the measurement result to the CPU 20”, (col 28, lines 41-47, Shimizu’ 277).

Therefore, having a system of Shimizu ’277 reference and then given the well-established teaching of Mahy ’109 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Shimizu ’277 reference to include a transformation module for automatically reducing said particular dimensional order based on determining which color value among said

plurality of color values has attained said gamut limit, thereby providing improved control for colors that are located external to said gamut as taught by Mahy ’109 reference; and to include an adder module for adding feedback obtained through said transformation module, thereby providing improved control for colors that are located external to said gamut as taught by Mestha ’474. The motivation for doing so would have been to improve the control of an L*a*b* value of a certain color which is outside a target color gamut and hence for better image reproduction quality, and further the disclosures provided by Mahy ’109 and Mestha ‘474 could be implemented by one another with predictable results.

Regarding **claim 11**, in accordance with claim 10.

Dependent claim 11 recites identical features as claim 10. Thus, arguments similar to that presented above for claim 10 are also equally applicable to claim 11.

Regarding **claim 12**, in accordance with claim 10

Shimizu teaches wherein said particular dimensional order comprises a three-dimensional order (**e.g. color conversion table is used to store the calculated three-dimensional arrays of C[L][a][b], M[L][a][b] and Y[L][a][b], col 12, lines 30-42**).

Regarding **claim 15**, in accordance with 12.

Shimizu differs from claim 15, in that he does not teaches wherein said transformation module further comprises a transformation module for reducing said three-dimensional order to a one-dimensional order

Mahy teaches wherein said transformation module further comprises a transformation module for reducing said three-dimensional order to a one-dimensional

order (**Mahy discloses an mathematical model showing how a 3-dimensional order is reduced to 1-dimensional order, col 12, lines 36-64**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include a said transformation module further comprises a transformation module for reducing said three-dimensional order to a one-dimensional order taught by Mahy because it helps to determine the exact boundaries of the color gamut per lightness level from a set of discrete points (col 4, lines 17-43). Therefore, by combining Shimizu with Mahy, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claim 16,** recite identical features as claim 15. Thus, arguments similar to that presented above for claim 15 are also equally applicable to claim 16.

Regarding **claim 19**, **in accordance with claim 10.**

Shimizu teaches a color rendering device (**e.g. printer**) associated with said transformation module and wherein said transformation module is integrated with said image processing device (**refer to Figs 6-7 and Figs. 18 & 19, a color conversion table for printer for converting L*a*b* values to CMY values, col 60 to col 12, line 19**).

Regarding **claim 20**, **in accordance witch claim 10.**

Shimizu discloses an iterative controller's iterative output is input to said color rendering device (**Input/Output Device 25 of Fig. 18 & Printer 32 of Fig. 19**), such that said iterative output of said iterative controller reflects a plurality of compensated color values requiring correction for rendering variations thereof (**e.g. the process of**

color transform and compensation is performed for each color value data of each pixel by the controller of a printer, col 1, lines 30-40,; thus the processes of Figs. 5-16, must repeated for each pixel color value data).

4. Claims 13-14, 17-18, and 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Mahy (US 5,832,109) and Mestha et al (US 6,236,474) as applied to claims 10 and 12, and further in view of Holub (US 6,750,992).

Regarding **claim 13**, in accordance with claim 12.

Shimizu differs from claim 13, in that he does not teach wherein said compensation module further comprises a transformation module for reducing said three-dimensional order to a two-dimensional order using a standard International Color Consortium (ICC) framework.

Mahy teaches wherein said transformation module for reducing said three-dimensional order to a two-dimensional order (**e.g. reducing a 3-dimensioanl color space to a two-color space, col 12, lines 19-32**); and

Holub teaches compensation using a standard International Color Consortium (ICC) framework (**compensation function LUTs to compensate for any non-linearities between light intensity, etc., col 20, lines 4-34 and using the internationally accepted standard, i.e. ICC, col 44, lines 65-66**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include a said transformation module

further comprises a transformation module for reducing said three-dimensional order to a two-dimensional order taught by Mahy because it helps to determine the exact boundaries of the color gamut per lightness level from a set of discrete points (col 4, lines 17-43), and then to modify the combination of Shimizu and Mahy to include compensation using a standard International Color Consortium (ICC) framework as taught by Holub. The motivation is to compensate color value difference with a well recognized standard which quantifies color in term s of what normal humans see, rather than in terms of a specific samples or instances of color produced by particular equipment. Therefore, by combining Shimizu with Mahy and Holub, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claim 14**, in accordance with claim 13.

Shimizu differs from claim 14, in that he does not teaches wherein said compensation module reduces said three-dimensional order to said two-dimensional order in response to determining which colors among said plurality of colors have attained said gamut limit.

Mahy teaches wherein said transformation (or compensation) module reduces said three-dimensional order to said two-dimensional order in response to determining which colors among said plurality of colors have attained said gamut limit (**Fig. 3, col 12, lines 19-32 and col 14, lines 34-64**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu to include a said transformation (compensation) module reduces said three-dimensional order to said two-dimensional

order in response to determining which colors among said plurality of colors have attained said gamut limit taught by Mahy because it helps to determine the exact boundaries of the color gamut per lightness level from a set of discrete points (col 4, lines 17-43). Therefore, by combining Shimizu with Mahy, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claims 17 and 18, in accordance with claim 10.**

Shimizu and Mahy differ from claims 17 and 18, in that both Shimizu and Mahy do not teach wherein said color sensor comprises an offline sensor and an inline sensor.

Holub teaches wherein said color sensor comprises an offline sensor (**referring to Fig. 3A, and col 11, lines 66-67 & col 12, lines 1-19, an offline sensor, a color measuring instrument, or CMI for measuring the color output of the rendering device)** and an inline sensor **(referring to Figs. 3B-C, and col 15, lines 42-67 & col 16, lines 1-24, an inline sensor, a CMI as a unitary colorimeter SOM 13 take color measurements via lens system by connecting to the fiber optic pickup**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu and Mahy to include an offline sensor and an inline sensor taught by Holub to improve communication, control and quality of color reproduction (**col 3, lines 3-15**). Therefore, by combining Shimizu and Mahy with Holub, a predictable success of controlling out-of-gamut memory and index color can be achieved.

Regarding **claim 21**, in accordance witch claim 18.

Shimizu teaches wherein said color rendering device comprises a printer (**Printer 32 of Fig. 19**).

Regarding **claim 22**, in accordance witch claim 18.

Shimizu teaches wherein said color rendering device comprises a photocopy machine (**Input/Output Device 25 of Fig. 18**).

5. Claims 1-4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Mahy (US 5,832,109).

Regarding **claim 1**.

Claim 1 is directed to a method claim in which the image process is performed by an image processing device and thus it meets the 35 U.S.C. 101 statutory requirements.

Shimizu discloses a method, comprising: automatically providing a plurality of color values (**such as L255*, a255* & b255* value, corresponding to CMY color data value, col 2, lines 28-59, and as shown in Fig. 5, L*a*b* value is input to the system for process, col 10, lines 10-35**) as input to an image processing device (**e.g. L*a*b* values based on the measurement of a patch outputted from the printer corresponding to CYM values are as input initial value; since the L*a*b* values obtained and inputted in the process are not manually performed, thus data is automatically provided as input to the image processing device shown in Figs. 18 & 19; see Figs. 5 & 7, col 11, line 65 to col 12, line 19 for full detail**), wherein said image processing device is under a control of a particular dimensional order (**e.g.**

processing in three three-dimensional arrays, col 13, lines 51-65);

dynamically determining which color value among said plurality of color values has attained a gamut limit (**e.g. Shimizu discloses a flowchart or algorithm which has a steps to determine shortest distance from boundary of color gamut in Figs. 7 & 9, judging whether color value is near the color gamut boundary which is actively or dynamically performed, col 13, lines 5-37 & col 15, lines 41-66**);.

Shimizu does not disclose that transforming said particular dimensional order of said color which was determined to have attained said gamut limit, in response to dynamically determining which color value among said plurality of color values has attained gamut limit; and thereafter automatically reducing said particular dimensional order through use of a dedicated gamut mapping function utilized to determine surface points and axes, thereby allowing for an improved estimate of said color based on said reduced dimensional order, thereby providing improved control for colors that are located external to said gamut and maintaining said color's hue.

Mahy teaches that that transforming said particular dimensional order of said color which was determined to have attained said gamut limit, in response to dynamically determining which color value among said plurality of color values has attained gamut limit (**e.g. one color value c_3 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58**); and automatically reducing said particular dimensional order through use of a dedicated gamut mapping

function utilized to determine surface points and axes, (**e.g. one color value c_3 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58, and a surface of colorant in a three-dimensional color space is mapped to the 2-dimensional color gamut boundaries, col 12, lines 35-49; and Figs. 14A-14H disclose cross sections of pints and axes, col 11, lines 30-50**) thereby allowing for an improved estimate of said color based on said reduced dimensional order (**e.g. Mahy discloses an example mathematical model of 3-ink process with one color value c_3 reaches its limit at 0, dimensional order of 3-ink process is automatically reduced to 2-ink process because an n-ink process is completely characterized by its colorant gamut with a number of colorant limitations, col 14, lines 50-64 & col 1, lines 49-58**); and thereby providing improved control for colors that are located external to said gamut (**Mahy explored the method to improve control of colors that are located outside of the gamut, i.e. classes 2 and 4, col 16, 26 to col 17, line 34**) and maintaining said color's hue (**e.g. maintained constant hue, col 21, lines 10-31**).

Mahy's teaching is combinable to modify Shimizu et al reference for reducing dimensions. For example, "**If the amount of conversion C is 10 or less, it is judged that the point is near to a color gamut boundary, and a point (Ld0, ad0, bd0) in an L*a*b* space is converted to the nearest point on the color gamut boundary on the condition that Ld0=L0, ad0=a0 and bd0=b0 using the closest neighborhood**

method described earlier in which problem 1 is likely to occur (step S19)" (col 13, lines 5-15), and by combining Mahy's teaching with Shimizu et al's reference, dimensional order of 3-ink can be reduced to a two-ink process, which, can improve the out of gamut color control process.

Having a system of Shimizu' 277 reference and then given the well-established teaching of Mahy' 109 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the system of Shimizu' 277 reference to include that transforming said particular dimensional order of said color which was determined to have attained said gamut limit, in response to dynamically determining which color value among said plurality of color values has attained gamut limit; and thereafter automatically reducing said particular dimensional order through use of a dedicated gamut mapping function utilized to determine surface points and axes, thereby allowing for an improved estimate of said color based on said reduced dimensional order, thereby providing improved control for colors that are located external to said gamut and maintaining said color's hue as taught by Mahy' 109 reference. The motivation for doing so would have been to improve the control of an L*a*b* value of a certain color which is outside a target color gamut and hence for better image reproduction quality, and further the mathematical model provided by Mahy' 109 could be implemented by one another with predictable results.

Regarding **claim 2**, in accordance with claim 1.

Shimizu discloses wherein a color sensor (**e.g. measurement of L*a*b* values indicates that a color sensor must be used for color measuring, col 11, lines 65-**

67 & col 12, lines 1-19) is used in dynamically determining which color value among said plurality of color values has attained a gamut limit (**Shimizu discloses a flowchart or algorithm which has a steps to determine shortest distance from boundary of color gamut in Figs. 7 & 9, to obtain CMY value corresponding to an L*a*b* value based on the measurement value of a patch outputted from the printer; thus the distance between a point whether inside or outside the gamut and the boundary of gamut must be dynamically determined utilizing a color sensor, col 11, line 60 to col 12, line 5**).

Regarding **claim 3**, recite identical features as claim 12, except claim 3 is a method claim. Thus, arguments similar to that presented above for claim 12 are also equally applicable to claim 3.

Regarding **claim 4**, recite identical features as claim 13, except claim 4 is a method claim. Thus, arguments similar to that presented above for claim 13 are also equally applicable to claim 4.

Regarding **claim 5**, recite identical features as claim 15, except claim 5 is a method claim. Thus, arguments similar to that presented above for claim 15 are also equally applicable to claim 5.

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (US 7,167,277) in view of Mahy (US 5,832,109) as applied to claim 1, and further in view of Terekhov (US 2004/0096104).

Regarding claim 6, in accordance with claim 1.

Shimizu does not disclose wherein a ray-based approach consisting of a ray being drawn from a desired color to a point on a neutral axis through said gamut limit is used to perform said gamut mapping.

Terekhov teaches wherein a ray-based approach consisting of a ray being drawn from a desired color to a point on a neutral axis through said gamut limit is used to perform said gamut mapping (**refer to Figs. 8A, 8B and 9, a ray-based approach consisting of a ray from L*-axis, a neutral axis through gamut limit is used for gamut mapping, Par. 63**)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Shimizu and Mahy to include wherein a ray-based approach consisting of a ray being drawn from a desired color to a point on a neutral axis through said gamut limit is used to perform said gamut mapping as taught by Terekhov to improve color mapping of gamut because gamut mapping requires coordinates of the points having the maximal chromaticity for a current gamut boundary (par. 71). Therefore, by combining Shimizu and Mahy with Terekhov, a predictable success of gamut mapping can be achieved.

7. Claims 7 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Mahy (US 5,832,109) and further in view of Terekhov (US 2004/0096104) as applied to claim 6, and further in view of Holub (US 6,750,992).

Regarding **claims 7 and 8**, in accordance with claim 6.

Shimizu and Mahy differ from claims 7 and 8, in that the combination of Shimizu, Mahy and Terekhov does not teach wherein said color sensor comprises an offline sensor and an inline sensor.

Holub teaches wherein said color sensor comprises an offline sensor (**referring to Fig. 3A, and col 11, lines 66-67 & col 12, lines 1-19, an offline sensor, a color measuring instrument, or CMI for measuring the color output of the rendering device)** and an inline sensor **(referring to Figs. 3B-C, and col 15, lines 42-67 & col 16, lines 1-24, an inline sensor, a CMI as a unitary colorimeter SOM 13 take color measurements via lens system by connecting to the fiber optic pickup**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified the combination of Shimizu, Mahy and Terekhov to include an offline sensor and an inline sensor taught by Holub to improve communication, control and quality of color reproduction (**col 3, lines 3-15**). Therefore, by combining the combination of Shimizu, Mahy and Terekhov with Holub, a predictable success of controlling out-of-gamut memory and index color can be achieved.

8. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimizu et al (Shimizu) (US 7,167,277) in view of Ohkub (US 6,229,916).

Regarding claim 23.

Shimizu discloses a method, comprising: automatically providing a plurality of desired L*a*b* memory color values (**such as L255*, a255* & b255*, memory values, corresponding to CMY color data value, col 2, lines 28-59, and as shown in Fig. 5,**

L*a*b* value is input to the system for process, col 10, lines 10-35) as input to a transformation module (**e.g. L*a*b* values based on the measurement of a patch outputted from the printer corresponding to CYM values are as input initial value; since the L*a*b* values obtained and inputted in the process are not manually performed, rather, the programmed process is executed and performed by a computer of Figs. 18 and 19, thus, data is automatically provided as input to the image processing device shown in Figs. 18 & 19; see Fig. 5, col 10, lines 12-16**); transforming said L*a*b* memory color values into NDC memory color values (**i.e. color values of a color point with a point coordinate, i.e. NDC, or any point coordinate outside the color gamut as disclosed in Figs. 6A-6B and 8A-8B**) using a transformation function (**referring to Fig. 5, Step 5, L*a*b* is converted, or transformed, col 10, lines 12-35, and Fig. 6A shows color point, i.e. P6, or NDC, a point coordination located outside of color gamut**); providing said compensated CMY color values as input to a graphical rendering device (**i.e. "in order to output a color of a certain L*a*b* value on a printer, it is sufficient to convert the L*a*b* value to an appropriate CMY value according to the color processing characteristics of the CMY value of each printer and to transmit the CMY value to a printer to print the color. Basically, by compensating for color processing characteristics", col 1, lines 54-60**); printing patches of said compensated CMY color values (**i.e. patches corresponding to CMY values outputted from a printer, col 12, lines 5-9**); generating measured L*a*b* values for said patches (**i.e. L*a*b* values are obtained by measuring the patch, col 12, lines 5-9**); providing said patches as input

to a color sensor (**i.e. CMY patch outputted from a printer is measured to determine CMY color value in CMY space, and L*a*b* values are therefore obtained; thus, patches must be as input to a color sensor or color measurement device, col 11, line 65 to col 12, line 19**); providing said measured L*a*b* values as input to a second transformation module which transforms said L*a*b* values into NCD values (**referring to Fig. 5, Step 5, L*a*b* is converted, or transformed, col 10, lines 12-35, and Fig. 6 shows color point, i.e. P6, or NDC, located outside of color gamut**); thereby completing a feedback loop which minimizes the error between the measured color and the desired L*a*b* memory color providing improved control for colors that are located external to said gamut (**referring to Fig. 7, steps 11 to 22 are repeated when a color point falls outside of gamut until it values are adjusted, or transformed within the gamut, col 12, line 42 to col 14, line 11**).

Shimizu does not disclose providing said NCD memory color values to an adder; providing the output from said adder as input to an iterative controller which outputs compensated CMY color values; providing said patches as input to a color sensor.

In the same field of endeavor, Ohkubo teaches said NCD memory color values to an adder (**i.e. referring to Fig. 13, if a color point is judged that is outside of a gamut, then L*a*b* value is adjusted, and added back into the loop, and repeat steps 3, 4 & 5, until the L*a*b* value is within the gamut; thus, in this process, NCD values, or the value of a color point outside the gamut is added into the loop for processing, col 30, lines 4-19**); providing the output from said adder as input to an iterative controller which outputs compensated CMY color values (**referring to Fig. 13,**

as stated above, if a color point is judged that is outside of a gamut, then L*a*b* value is adjusted, and added back into the loop, and repeat steps 3, 4 & 5, until the L*a*b* value is within the gamut; thus, in this process, NCD values, or the value of a color point outside the gamut is added into the loop for processing, col 30, lines 4-19).

Shimizu and Ohkubo are combinable because of these references are in the same filed of endeavor of controlling, converting or transforming color outside of a color gamut, or outside of the range or limit of image reproduction that a rendering device, i.e. printer, can handle and therefore, to improve image reproduction quality.

Having a method of Shimizu ‘277 reference and then given the well-established teaching of Ohkubo ‘916 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Shimizu’ 277 reference to include providing said NCD memory color values to an adder, and providing the output from said adder as input to an iterative controller which outputs compensated CMY color values as taught by Ohkubo ‘916 reference. The motivation for doing so would have been to improve the control of color which is outside a target color gamut, and hence for better image reproduction quality, and further the disclosure provided by Ohkubo ‘916 could be implemented by one another with predictable results.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

CONTACT INFORMATION

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Kau whose telephone number is 571-270-1120 and fax number is 571-270-2120. The examiner can normally be reached on Monday to Friday, from 8:30 am -5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Steven Kau/
Examiner, Art Unit 2625
June 25, 2010

/King Y. Poon/
Supervisory Patent Examiner, Art Unit 2625